The Teachers

Andrea MUSONE has more than 20 years experience in software engineering and software quality. He contributed to the definition of software standards for large Space programs. Consultant to International Organizations and other relevant Companies. Teacher of ECSS and DO-178 standards. Team member for CMMI appraisals. He has also a large technical experience in several software domains, such as GIS, and Earth Observation. Several years consultant to Air Navigation Services in the frame of European Projects.

Daniela Viva has about 20 years of experience in safety critical systems in railway, automotive and avionic domain. Senior safety assessor of software applications in the railway domain, teacher of CENELEC EN 50128-50129 and consultant with gained experience in safety assessment process analyses: system and subsystem Hazard Analysis, FTA, FMEA, according to CENELEC EN50126, EN50128, EN50129, EN50159-1, EN50159-2, IEC 61508, ISO 26262, SAE ARP4754.

The Company

Since 1974, INTECS has been operating at the forefront of the software market, where safety, reliability, innovation, and quality are essential for success. INTECS provides leading-edge software technologies to support the major European and Italian organisations in the design and implementation of advanced electronic systems for Defence, Space, and Civilian markets.

Intecs is ISO-9000 certified since 1994. Currently it holds ISO 9001:2008 quality certification for software development in Defence, Space, and Civilian domains. Moreover, Intecs Defence, ATC, and Railways Divisions have been positively appraised at CMMI® Maturity Level 3. On 2015, it has been equally qualified at Level 3 according to Automotive Spice®.

General Information

Location

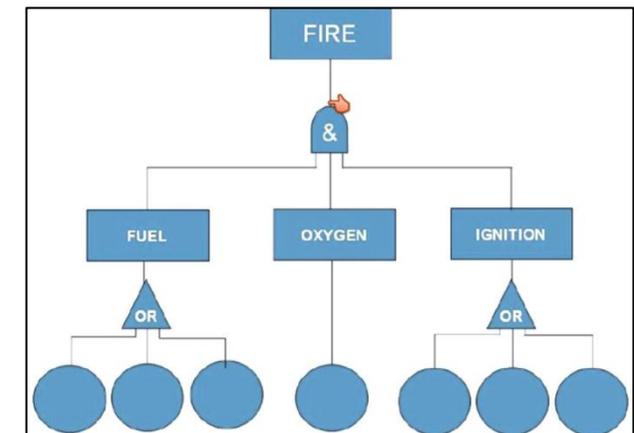Upon request, the course may be held in-house at customer site.

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Fault Tree Analysis (FTA)

Single day course

FTA

FTA (Fault Tree Analysis) is a top down, deductive failure analysis in which an undesired state of a system is analysed using Boolean logic to combine a series of lower-level events.

FTA principal reference is IEC 61025 International Standard, but it is also addressed by domain-specific standards, such as Space ECSS-Q-ST-40-12C *Fault tree Analysis* (endorsing IEC 61025 itself, with a few variants).

From a general perspective, a good reference is in MIL Standard MIL-STD-1553B – *Designer's Guide*.

The Course

The objective of the course is to provide a detailed knowledge of the FTA methodology for systems, from early design phase up to operation.

The course introduces the overall FTA objective, with its concepts, notation, and related applications. The course is interleaved with some examples.

Intended audience

Large part of first half-day course part should be attended by Project Managers, Quality Managers, Safety Managers, and Quality/Safety/System Engineers who need to understand the principles of Fault Tree Analysis and their usage in order manage Reliability, Availability, Maintainability, and Safety (RAMS) in their projects.

Second half-day course, leveraging also on some FTA examples/exercises, might be attended solely by Quality/Safety/System Engineers.

Prerequisites

Participants are required to know the basic system engineering principles.

Benefits

Most of first half-day course will primarily let managers and engineers become familiar with Fault Tree Analysis method. They will then be able to interact with own customers, higher-level project managers, their development teams, and suppliers (if any). Moreover, they will know where to find more information, when necessary.

Tail of first half day and second half-day will mainly let Dependability Analysts and System Designers and Developers more closely familiarize with FTA usage in actual projects.

Material

All participants will be provided with a copy of course handouts (PDF format).

Course Outline

First half day

Basic Concepts

FTA objectives

FTA events: top, basic, primary, intermediate, and undeveloped.

FTA Boolean Algebra: AND, OR gates.

Cut Sets

Minimal Cut Sets

Top Event Definition

Intermediate Event Definition

Second half day

Fault Tree building

Quantitative Analysis

Qualitative Analysis

Evaluation of Top Event

Minimal Cut Set Determination

Common Mode Analysis

FTA conclusions: benefits, limitations and recommendations.

Domain specific FTA (automotive, railway, avionic, space, military) examples